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DISCLOSURE TITLE: Decoupling Capacitor Structure to Reduce
FET Output
Driver Switching Noise

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DISCLOSURE TEXT:

- A typical FET (field-effect transistor) output driver circuit is shown in Fig. 1. FETs 10 and 12 in series between the DC supply and ground are driven by input signals I1 and I2. The common connection between FET 10 and FET 12 drives the output load. A capacitor 14 connected between the supply voltage and ground prevents any output switching noise on the DC supply voltage by supplying high frequency switching currents locally to the output FETs. ***** SEE ORIGINAL DOCUMENT ***** The decoupling capacitor 14 should have high capacitance, low lead inductance, small size, and must be located as close as possible to the output FET devices 10 and 12. A typical layout which meets the necessary criteria is shown in Fig. 2 using two levels of metal, M1 and M2. Any layout which satisfies the requirements is suitable.

The high capacitance required is achieved, as shown in Fig. 3, by removing the polyimide layer 14B in the capacitor plate region 16, leaving a thin layer of nitride 14C separating the M2 metal 14A from the M1 metal 14D. The high dielectric constant of the nitride (approximately 7) results in a high capacitance for reasonable values of nitride thickness and capacitor area.

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FIG. 1

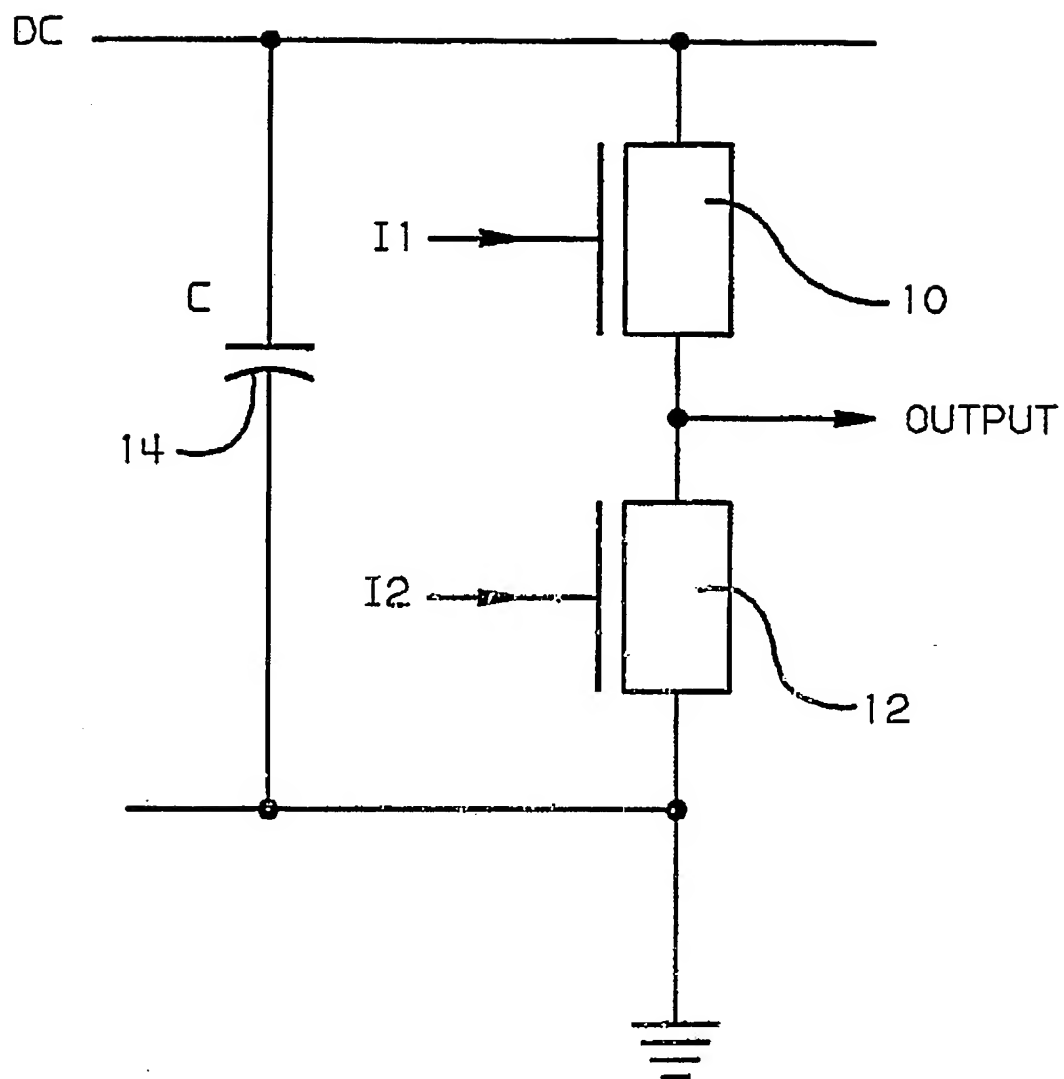


FIG. 3

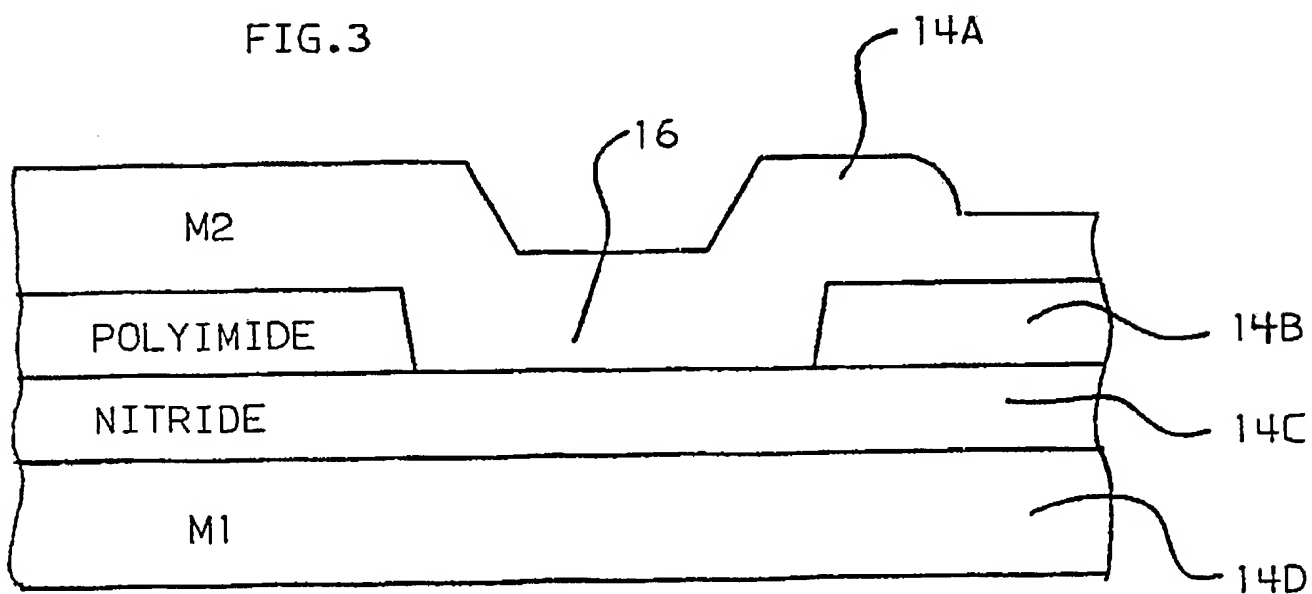


FIG.2

